REMARKS

Applicants have considered the pending Office Action and references cited and have elected to amend the pending claims and submit additional new claims to more clearly describe the inventions. Specifically, independent claims 12, 18, 40, 47, 48, 60, and 75-78 have been amended, along with a few dependent claims, for clarification. Further new claims 79-117 have been added. No new matter is added with these amendments.

Interview Summary

Applicants and their representatives want to express their appreciation to Examiner Garcia-Otero, Supervisory Patent Examiner Kevin Teska and Primary Examiner Bill Thomson. Applicants' representatives appreciate the time taken by all involved to discuss the status of the case and the art being applied in the Office Action. During the interview, Applicants' representatives explained how the subject matter of the application differed from that disclosed in the art applied in the Office Action, namely U.S. Patent No. 6,324,678 to Dangelo et al. ("Dangelo '678"). In addition, James Hakewill, one of the inventors, went through a few PowerPoint slides explaining the background of the various claimed inventions and how one embodiment of the assignee's systems differed from Dangelo '678. The Examiners requested a copy of the slides discussed by Mr. Hakewill.

Applicants representative also presented a sample claim indicating a proposed manner of more clearly defining the inventions disclosed in the application. The Examiners then indicated that Applicants' representatives should consider U.S. Patent No. 6,477,683 in finalizing a response to the Office Action. In addition, the Examiners indicated that one or more additional references would be provided for Applicants' representatives to review. Several days after the interview, Examiner Garcia-Otero provided U.S. Published Application No. 2003/0208723 and indicated that to be the only reference the PTO would be supplying for consideration.

PowerPoint Slides

Applicants are providing a copy of the PowerPoint slides discussed by inventor James Hakewill as an attachment hereto. These slides discuss ARC's invention in terms of one specific embodiment. In no way are these slides intended to change, affect, alter or define the scope of the claims as presented.

Supplemental Information Disclosure Statement

A supplemental information disclosure statement is being filed herewith containing additional references that Applicants submit for consideration. The references submitted were contained in a reexamination request filed in U.S. Patent No, 6,477,683, a patent cited by the Office during the Interview.

Consideration of References Cited by Patent and Trademark Office

As requested, Applications have considered both U.S. Patent No. 6,477,683 and U.S. Publication Patent Application No. 2003/0208723. Neither the '683 Patent or the '723 Publication qualifies as prior art under 35 U.S.C. § 102 because these references have an effective filing date after the effective filing date of the above-referenced patent application.

Status of Rejections of Previously Presented Claims and Response Thereto

Claims 12, 14-16 and 18-22 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Dangelo '678 in view of U.S. Patent No. 6,378,123 to Dupenloup ("Dupenloup '123"). In addition, claims 13, 17, 40, and 48 stand rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Dangelo '678 in view of Dupenloup '123 and further in view of U.S. Patent No. 6,173,434 to Wirthlin ("Wirthlin").

In addition, claim 41 stands rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Dangelo '678, Dupenloup '123, Wirthlin '434 and U.S. Patent No. 5,903,475 to Gupte ("Gupte"). Claim 42 stands rejected under 35 U.S.C. § 103(a) as being allegedly

unpatentable over Dangelo '678, Dupenloup '123, Wirthlin '434 and official notice. Claims 47, 77 and 78 stand rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Dangelo '678 over Gupte and Wirthlin '434. Claims 60-62 and 64-74 stands rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Dangelo '678 in view of Wirthlin '434. Claim 63 stands under 35 U.S.C. §103(a) as being allegedly unpatentable over Dangelo '678 in view of Withlin '434 and U.S. Patent No. 5,994,892 to Turino ("Turino"). Claims 75 and 76 stand rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Dangelo '678 in view of Gupte. Each of these rejections is traversed in view of the preceding amendments to the claims.

Specifically, each of the pending independent claims has been amended to clarify distinctions between those claims and the primary reference in each of these rejections - Dangelo '678. Moreover, Applicants assert that the secondary references utilized in each of these rejections fails to make up for the deficiency of Dangelo '678 as applied to the claim in question.

Claim 12 has been amended to recite three acts as part of the method including "receiving one or more inputs from a user for at least one customized parameter of the integrated circuit; receiving an identification of a location of one or more library files that provide at least one prototype description and at least one extension logic description for the integrated circuit for which a model is being generated; and generating through an automated process a customized description language model based on at least one customized parameter, the at least one prototype description, and the at least one extension logic description, the automated process including the acts of reading at least one prototype description and modifying the at least one prototype description by substituting values in the at least one prototype descriptions or merging additional descriptions based on the at least one customized parameter." Those three acts are not disclosed in combination by Dangelo '678 or Dupenloup '123. Rather, Dangelo '678 provides a

system for a user to manually write hardware description language, but nothing in Dangelo '678 discloses or suggests "generating through an automated process a customized description language model based on at least one customized parameter, the at least one prototype description, and the at least one extension logic description" as claim 12 now recites. Moreover, claim 12 further recites acts performed as part of generating the customized description language model as including "reading one or more prototype descriptions and modifying the one or more prototype description by substituting values in the one or more prototype description or merging additional descriptions based on the at least one customized parameter." Dangelo '678 fails to disclose or suggest substituting values in a prototype description through an automated process or merging additional descriptions based on a customized parameter through an automated process. For at least these reasons, claims 12-17 are allowable over the proposed Dangelo '678 and Dupenloup '123 combination. Moreover, as discussed in greater detail below, evidence of commercial success, recognition by others and licensing by others attributed at least in part to the elements of claim 12, as amended, is being presented herewith with presents evidence of the non-obviousness of claim 12.

Claim 18 has been amended to recite that the computer program (which is part of an apparatus adapted to generate integrated circuit designs), the computer program being adapted to perform the same three acts amended into claim 12. Thus, for the reasons discussed above with respect to claim 12, Dangelo '678 fails to disclose or suggest the three act combination added to claim 18 and Dupenloup '123 fails to cure that deficiency. The independent evidence of commercial success, recognition by others and licensing by others further establishes the non-obviousness of claim 18.

Claim 40 is a system claim that has been amended to recite three elements in place of several previous elements. The three elements are "an input receiving module that receives one or more inputs from a user for at least one customized parameter of an integrated circuit device, the at least one customized parameter comprising a parameter selected from the group comprising a custom instruction, a cache configuration, a memory interface configuration and a system architecture configuration; a library file receiving module that receives an identification of a location of one or more library files that provide at least one prototype description and at least one extension logic description for the integrated circuit device for which a model is being generated; and a generation module that generates a customized description language model based on at least one customized parameter, the at least one prototype description, and the at least one extension logic description through acts including reading at least one prototype description and modifying the at least one prototype description by substituting values in the at least one prototype description or merging additional descriptions based on the at least one customized parameter." For example, Dangelo '678 fails to disclose an apparatus that includes a computer program that including modules that perform the functions recited above for the input receiving module, the library file receiving module or the generation module. Again, Dangelo '678 does not disclose or suggest a computer program that automates generation of customized description language models based on inputs, nor does it disclose or suggest such a program that does so through the acts recited for the generation module. Wirthlin '434 fails to cure the deficiency of Dangelo '678 and accordingly, the proposed combination of Dangelo '678 and Wirthlin '434 fails to render claim 40 unpatentable. In addition, the independent evidence of commercial success, recognition by others and licensing by others further establishes the non-obviousness of claim 40.

Claim 47 recites the acts of claim 12 and further specifies that at least one parameter includes a processor instruction, cache configuration, memory interface configuration or system architecture configuration. For all of the reasons claim 12 is allowable, claim 47 is also allowable. The deficiencies of Dangelo '678 and Dupenloup '123 are not cured by either Wirthlin '434 or Gupte. In addition, the independent evidence of commercial success, recognition by others and licensing by others further establishes the non-obviousness of claim 47.

Claim 48 recites the elements of claim 18 and further specifies that at least one parameter includes a processor instruction, cache configuration, memory interface configuration or system architecture configuration. For all of the reasons claim 18 is allowable, claim 48 is also allowable. The deficiencies of Dangelo '678 and Dupenloup '123 are not cured by Wirthlin '434. In addition, the independent evidence of commercial success, recognition by others and licensing by others further establishes the non-obviousness of claim 48.

Claim 60 differs from the preceding claims in several respects. In addition to the acts and elements recited in independent claims 12, 18, 40, 47 and 48, another embodiment of the present invention is recited through the recitations in claim 60, as amended. Specifically, while those claims relate generally to the automated generation of hardware description language modules based on customized parameters, claim 60 recites a method wherein one or more pre-defined instructions described in a hardware description language for a configurable processor are received along at least one user-defined extension description, described in user-supplied hardware description language. The method involves the act of generating a processor specification based on one or more of the pre-defined instructions described in a hardware description language and including a user-definable portion based on the at least one user-

defined extension description, the user-definable portion of said specification including at least one user-defined instruction having a function associated therewith. As claims 61 and 62 further clarify, that generation might involve generating control logic for the execution of the user-defined instruction or generating at least an instruction execution pipeline.

Dangelo '678 fails to disclose or suggest these features of claim 60, as amended. Rather, the cited portion of Dangelo '678 focuses on enabling the user to input instructions manually, much like a user inputs text into a word processor, but does not automate the generation of a specification based on pre-defined hardware description language instructions and user-defined configurable processor descriptions. And, Wirthlin '434 fails to cure those deficiencies. In addition, the independent evidence of commercial success, recognition by others and licensing by others further establishes the non-obviousness of claim 60.

Claim 75 recites the acts of claim 12 and further specifies that at least one parameter includes a custom instruction, cache configuration or memory interface configuration. For all of the reasons claim 12 is allowable, claim 75 is also allowable. The deficiencies of Dangelo '678 and Dupenloup '123 are not cured by Gupte. In addition, the independent evidence of commercial success, recognition by others and licensing by others further establishes the non-obviousness of claim 75.

Claim 76 recites a method including acts of "providing a user with a plurality of optional inputs, including the ability to generate a customized hardware description language code instruction; selecting at least one of said plurality of optional inputs; selecting at least one cache configuration; defining at least one memory interface; and generating through an automated process a customized description language model based on at least one optional input, cache configuration, and memory interface customized parameter, the automated process including the

acts of reading at least one prototype description, modifying the at least one prototype description by substituting values in the at least one prototype description or merging additional descriptions based on the at least one optional input, cache configuration and memory interface, and incorporating any customized hardware description language code instructions." Dangelo '678 fails to disclose or suggest a process of selecting these various inputs and then "generating through an automated process a customized description language model" based thereon. Again, Dangelo '678 fails to disclose automated generation of such a model and certainly does not disclose or suggest doing so through acts including "reading at least one prototype description, modifying the at least one prototype description by substituting values in the at least one prototype description or merging additional descriptions based on the at least one optional input, cache configuration and memory interface, and incorporating any customized hardware description language code instructions." For at least these reasons, claims 76 is allowable over the proposed Dangelo '678 and Gupte combination. Moreover, as discussed in greater detail below, evidence of commercial success, recognition by others and licensing by others attributed at least in part to the elements of claim 76, as amended, is being presented herewith with presents evidence of the non-obviousness of claim 76.

Claim 77 recites a description language model generated using a method that includes the elements added to claim 12 with a few modifications. Specifically, claim 77 recites that the parameters are selected from a plurality of input parameters including at least one extension instruction and a cache configuration. Moreover, claim 77 recites the act of "defining the location of at least one library file" instead of "receiving an identification of a location ... ." For all of the reasons that claim 12 is allowable, claim 77 is also allowable. The deficiencies of Dangelo '678 and Dupenloup '123 are not cured by Gupte or Wirthlin '434. In addition, the

independent evidence of commercial success, recognition by others and licensing by others further establishes the non-obviousness of claim 77.

Claim 78 also recites an act of "generating through an automated process a customized description language model." In claim 78, the act is based on "at least one optional instruction, the at least one basecase description, and the at least one extension logic description" and the automated process includes "the acts of reading at least one basecase description and modifying the at least one basecase description by substituting values in the at least one basecase description or merging additional descriptions based on the at least one customized parameter." Dangelo '678 fails to disclose or suggest the combination recited in claim 78 and Dangelo '678's deficiencies are not cured by Gupte or Wirthlin '434. In addition, the independent evidence of commercial success, recognition by others and licensing by others further establishes the non-obviousness of claim 78.

In addition to the amendments made to each of these claims, Applicants have added a number of new claims. Claims 79 and 85 recite the acts of "receiving one or more inputs from a user for at least one customized parameter of the microprocessor or microprocessor peripheral; receiving an identification of a location of one or more library files that provide at least one prototype description and at least one extension logic description for the microprocessor or microprocessor peripheral for which a model is being generated; and generating through an automated process a customized description language model based on the least one customized parameter, the at least one prototype description, and the at least one extension logic description, the automated process including the acts of reading at least one of the prototype descriptions and modifying the at least one prototype description by substituting values in the at least one prototype description or merging additional descriptions based on the at least one customized

parameter." As described above with respect to claim 12, Dangelo '678 and the other cited references fails to disclose or suggest that combination and the independent evidence submitted established non-obviousness. In addition, claim 85 recites the step of using the model in testing and then generating a second customized description language model based on input of one or more inputs for a customized parameter. For at least this additional reason claim 85 is allowable over the art relied upon by the Office Action.

Similarly, claims 91 and 97 recite an apparatus that includes the following elements: "an input module that receives one or more inputs from a user for at least one customized parameter of the microprocessor or microprocessor peripheral; a library file module that receives an identification of a location of one or more library files that provide at least one prototype description and at least one extension logic description for the integrated circuit device for which a model is being generated; and a description language model generator that generates a customized description language model based on the least one customized parameter, the at least one prototype description and the at least one extension logic description through an automated process that reads at least one prototype description and modifies the at least one prototype description by substituting values in the at least one prototype description or merging additional descriptions based on the at least one customized parameter." Again, these modules are not disclosed or suggested by Dangelo '678 or the other cited references. The evidence of non-obviousness being submitted herewith further supports a finding of non-obviousness. Also, claim 87 recites a module that enables testing of the model through a feedback module and then the "input receiving module enables the user to input an identification of one or more input for at least one customized parameter and the description language generator generates a second

customized description language model." This additional feature is believed to distinguish further over the art of record.

Finally, at the Examiners' suggestion, Applications have included four sets of independent claims directed to various testing features. For example, claims 102 and 104 recite "generating through an automated process test code associated with the customized description language model." Also, claims 106 and 108 recite "a test code generator that generates through an automated process test code associated with the customized description language model based on the at least one customized parameter." It is asserted that this additional feature is not disclosed or suggested by Dangelo '678 or the other cited references.

Evidence of Long-Felt Need, Commercial Success and Industry Recognition of the Claimed Features Supports Non-obviousness

In addition to the foregoing, Applicants are submitting a Declaration of Peter Hutton under 37 C.F.R. § 1.132 ("Hutton Decl.") describing the commercial success of Applicants' commercial product that practices features of the claimed inventions.

As Mr. Hutton testifies, the assignee of the present application, ARC International ("ARC"), licenses and sells microprocessor and integrated embedded system solutions, that include or result from various claims in the above-referenced application. For example, an embodiment of claim 12 offered by ARC allows developers to customize processor designs for a specific application. Other features and limitations of the invention claimed in the '663 application are also present in the configuration tool for customizing processor design. Hutton Decl. ¶ 6.

Prior to ARC's introduction of the ARChitect Processor Configuration Tool, there was an unsolved need in the area of processor design. The claimed inventions of the present invention

respond to that unsolved need by providing an automated design tool that enables ASIC (Application Specific Integrated Circuit) and other types of developers to choose CPU extensions and configuration options through a GUI (Graphical User Interface). The ARChitect Processor Configuration Tool has been well received by ARC's customers who are taking advantage of the unique capabilities of configurable processors and configurable tools-capabilities that standard parts with fixed architectures cannot match. Hutton Decl. ¶ 8.

In addition, while initial licensing of the product was slow, once customers began to use the ARC product embodying claims of the present invention, the number of licensed chips increased dramatically. Specifically, during the second quarter of 2003, 2.5 million licensed chips incorporating ARC's invention were sold generating royalty revenue of $ 453,141. Licensed sales of chips with ARC's invention increased dramatically over successive quarters, and in the first quarter of 2004, ARC sold 14.7 million licensed chips with royalty revenue of $1,406,896, as this resulted in an increase in total chip sales of 495%, and an increase of revenue of 210%. Hutton Decl. ¶ 10.

Moreover, industry recognition of the ARChitect configuration tool's advancement over the prior art also supports non-obviousness. let to an increase in ARC's market share, and many well known industry leaders began licensing ARC's processors as evidenced by the list of current licensees. Hutton Decl. ¶.

In October of 1999, ARC began full distribution and licensing of the ARChitect configuration tool product, which is used in designing customized, and configurable processors in accordance with the teachings of the '663 application. The customized, and configurable processors designed in accordance with the '663 application received numerous industry awards, such as nominations for the 2003 Microprocessor Report Analyst's Choice for the ARC 600 in

the 'Soft IP Processor Cores' category, and the 2002 Microprocessor Report Analyst's Choice for the ARCtangent-A5 in the 'Embedded IP Processor' category.

In addition to the reasons set forth above, the evidence submitted in the Hutton Declaration further supports rescission of the pending rejections of the previously submitted claims, as well as supporting the non-obviousness of all pending claims.

CONCLUSION

Applicants assert that all pending claims are allowable over the art of record and therefore this application is in condition for allowance. Applicants therefore respectfully request that the Examiner allow these claims and pass the application to issue.

If there are any other fees due under 37 C.F.R. §§ 1.11 or 1.17 which are not enclosed herewith, including any fees required for an extension of time under 37 C.F.R. § 1.136, please charge such fee to our Deposit Account No. 50-0206.

If the Examiner has any remaining informalities to be addressed, prosecution can be expedited if the Examiner contacts the undersigned attorney for a telephone interview to discuss resolution of such informalities.

Respectfully submitted,

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